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**SYSTEM PROGRAM PLAN
AND
PROJECT IMPLEMENTATION PLAN
FOR
LORAN AVIATION MONITOR**



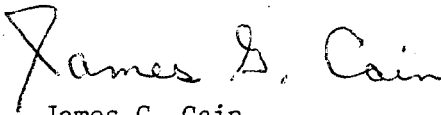
December 12, 1988

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

FOREWORD

This order provides, in one document, the Loran Monitor System Program Plan (SPP) and System Implementation Plan (SIP).

The loran monitor program will support non-precision Standard Instrument Approach Procedures (SIAP) using loran signals for horizontal guidance. The SPP, chapter 2, provides management direction, program reference material, and project guidelines for the loran monitor project. The SIP, chapter 3, provides a description of the required activities and assignment of specific responsibilities for various tasks to ensure successful program implementation.



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TABLE OF CONTENTS

	<u>Page No.</u>
CHAPTER 1. GENERAL	1
1. Purpose	1
2. Distribution	1
3. Background	1
4. Delivery Schedule	1
5. Acronyms	1
6. Memorandum of Understanding	1
7.-9. Reserved	2
CHAPTER 2. SYSTEM PROGRAM PLAN	3
SECTION 1. PROGRAM SUMMARY	3
10. Scope and Purpose	3
11. System Concept	4
12. Program References	4
13.-19. Reserved	5
SECTION 2. SYSTEM DESCRIPTION	7
20. Basic Characteristics	7
21. External Interfaces	9
22. Maintenance Concept	9
23. Software Philosophy	10
24.-29. Reserved	10
SECTION 3. PROGRAM FUNDING	11
30. General	11
31. Program Funding Status	11
32. Budget Submission Requirements	11
33.-39. Reserved	12
SECTION 4. PROGRAM SCHEDULE AND STATUS	13
40. General	13
41. Production Factors	13
42. Support Factors	13
43.-49. Reserved	14
SECTION 5. PROGRAM MANAGEMENT	15
50. General	15
51. Management Application	15
52. FAA Support Organizations	17
53.-59. Reserved	22

	<u>Page No.</u>
CHAPTER 3. PROJECT IMPLEMENTATION PLAN	23
SECTION 1. FIELD DEPLOYMENT	23
60. Construction Management Plan	23
61. Installation Plan	23
62. Configuration Management Plan	23
63.-69. Reserved	24
SECTION 2. PROGRAM RESPONSIBILITIES	25
70. General	25
71. FAA Headquarters	25
72. FAA Regions	28
73. Contractor	29
74.-79. Reserved	29
SECTION 3. COMMUNICATIONS	30
80. General	30
81. FAA Headquarters	30
82. FAA Regions	30
83. Contractors	30
84.-89. Reserved	32
SECTION 4. ACCEPTANCE INSPECTIONS	33
90. General	33
91. Contract Acceptance Inspection	33
92. Joint Acceptance Inspection	33
93.-99. Reserved	34
APPENDIX 1. DELIVERY SCHEDULE (12 pages)	1
APPENDIX 2. ACRONYMS (1 page)	1
APPENDIX 3. MEMORANDUM OF UNDERSTANDING - LORAN AVIATION MONITOR ANCILLARY SOFTWARE AND HARDWARE	1

LIST OF FIGURES

Figure 2-1	Functional Diagram of Loran Monitor	8
Figure 2-2	Program Management Structure	16

LIST OF TABLES

Table 2-1	Milestone Schedule Summary	13
Table 2-2	Program Management Organizations and Responsibility	20

CHAPTER 1. GENERAL

1. PURPOSE. This order transmits the system program plan (SPP), chapter 2, and system implementation plan (SIP), chapter 3, to provide the program management direction and guidelines for the implementation of the loran aviation monitors.
2. DISTRIBUTION. This directive is distributed to branch level in the Advanced System Acquisition Service, and Systems Maintenance Service in Washington headquarters; to branch level in the regional Airways Facilities divisions; and to branch level in the Facility Support Division, and the FAA Academy at the Mike Monroney Aeronautical Center.
3. BACKGROUND. LORAN-C was developed to provide Department of Defense (DOD) with a radio navigation capability having longer range and greater accuracy than its predecessor, LORAN-A. It was subsequently selected as the US government radio navigation system for civil marine use in the US coastal areas. Because of the low cost, ease of use, and high accuracy of loran receiver units, it gained popularity with general aviation and air taxi operators. In 1981 the FAA certified loran for IFR RNAV. With the implementation of this program's monitors it will be possible to certify nonprecision SIAP's as well.
4. DELIVERY SCHEDULE. The delivery schedule for all 212 loran monitors is included as appendix 1.
5. ACRONYMS. All acronyms used in this order are defined in appendix 2.
6. MEMORANDUM OF UNDERSTANDING. Loran aviation monitor configuration management (CM) procedures for the orderly transfer of CM responsibility from the program office to the regions and the depot.

6860.1

12/12/88

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CHAPTER 2. SYSTEM PROGRAM PLAN

SECTION 1. PROGRAM SUMMARY10. SCOPE AND PURPOSE

a. Loran transmitter program will provide supplemental air navigation service in the National Airspace System (NAS). The loran signal is presently used for enroute aircraft navigation. In the future the signal will be used for nonprecision SIAP's. The loran transmitters are owned, operated, and maintained by the United States Coast Guard (USCG) and provide navigation for both civil and military air and surface users. The service required for surface navigation is not the same as FAA requirements for SIAP's. Therefore the loran signal cannot be terminated when service degrades below the level required by the FAA. The FAA has no requirement to notify the USCG in the event of signal abbreviations.

b. The Loran monitor program will monitor the quality of the loran signal and go into alarm whenever it degrades below the level required to support a nonprecision SIAP. The monitors will also process and store time difference data for use in prediction model validation. The loran monitors are owned, operated, and maintained by the FAA. The loran monitor will consist of one "C" size chassis of solid-state equipment, mounted into remote communication outlet (RCO) racks at VOR facilities, and an external whip antenna. Existing communication links to the VOR Remote Monitor and Control-Facility (RMC-F) will be used by interfacing into the VOR Facility Central Processing Unit (FCPU). This will save approximately 6 million dollars per year in leased line costs.

c. The Department of Transportation has made a commitment to operate and maintain the loran system for civil users until the year 2000. A determination will be made at that time either to keep loran or to convert entirely to the Global Positioning System (GPS). This decision will be based on such factors as availability and accuracy of GPS, availability of low cost GPS receivers, user acceptance and utilization of loran and GPS, etc. A memorandum of agreement between the FAA and the USCG for the establishment of working arrangements for providing loran service for civil airborne users was signed in June 1986.

d. A benefit/cost analysis was done to evaluate the implementation of loran with and without the mid-continent signal gap being filled by the purchase of new transmitters. The analysis considered the total investment costs and projected operations and maintenance costs. In all cases, the benefit/cost ratio was greater than 1.2, and for the coastal areas alone the ratio was greater than 2.

11. SYSTEM CONCEPT

a. The procurement and installation of loran monitors will make possible the establishment of nonprecision approaches at airport locations where it is not currently justifiable. In some locations the terrain interferes with line of sight landing aids such as VOR and ILS. In other locations the airport traffic is too small to qualify for installation of expensive landing aids under the guidelines of Airport Planning Standard Number One. Loran eases both of these problems because of its long range, terrain following signal. It can provide coverage capable of supporting a nonprecision SIAP for very little facilities and equipment (F&E) cost. However, there will be a cost for development and maintenance of approach procedures.

b. The loran aviation monitor will be located in existing VOR facilities. This will save the FAA a considerable amount of money, since no new real estate, power hook ups, communication lines, etc., will be required. The loran aviation monitor will interface with the VOR FCPU and access existing communication lines from there. The interface will consist of an EIA RS-232c port, connector cable and an interface card which plugs into the FCPU motherboard. In addition, the monitor will be accessible from existing local and remote terminals that are connected to the VOR.

c. The monitor performs two functions. First, it constantly monitors the quality of the loran signal in space, and will go into alarm when loran signals are not within tolerances required to support non-precision SIAP's. The out-of-tolerance condition alarm will be similar to that of the VOR. An "L" (for loran) will be displayed on the RMC-F and RMC-C screens to specify the facility requiring attention. The AF technician monitoring the System Maintenance Monitoring Console will be able to notify AT personnel at the center that the loran monitor is in alarm. Appropriate air traffic procedures will be supplied for airspace effected by nonavailability of loran signals. Second, it collects data on the loran signal characteristics and stores it in nonvolatile memory.

These data are collected by the FCPU on a periodic, programmable basis and transmitted to a central data collection facility, to be established by AVN. Data are also available on demand from any VOR Input/Output Terminal (IOT).

12. PROGRAM REFERENCES. The Request for Proposal and system specification was issued on January 27, 1986. Contract award occurred on October 16, 1986 and is numbered DTFA01-86-C-00047.

12/12/88

6860.1

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SECTION 2. SYSTEM DESCRIPTION20. BASIC CHARACTERISTICS.

a. The loran aviation monitor was specified using a "top-down" approach. Existing hardware modules will be used to the extent possible to reduce design risk and enhance reliability. The system also has remote maintenance monitoring (RMM) which will identify failures down to the line replaceable unit (LRU). This design concept will not require maintenance visits more frequently than once every 2190 hours (quarterly) and will permit remote certification from a central maintenance facility. The projected mean time between failure is 10,000 hours. The loran monitor maintenance concept is compatible with the quarterly maintenance schedule currently in effect for the VOR system.

b. The monitor equipment, except for the antenna coupler and antenna, will mount in a standard 19-inch equipment rack. The equipment rack will be located in a VOR facility and will interface with the VOR FCPU through an RS-232 port. The FCPU will receive all operational, control, and status data from the loran monitor and forward it to the appropriate remote monitoring point over existing dedicated communication lines to the VORTAC RMC-F. The loran monitor consists of 6 discrete elements: (1) antenna and coupler, (2) loran receiver, (3) loran processor, (4) remote monitoring subsystem (RMS), (5) signal generator, (6) power supply.

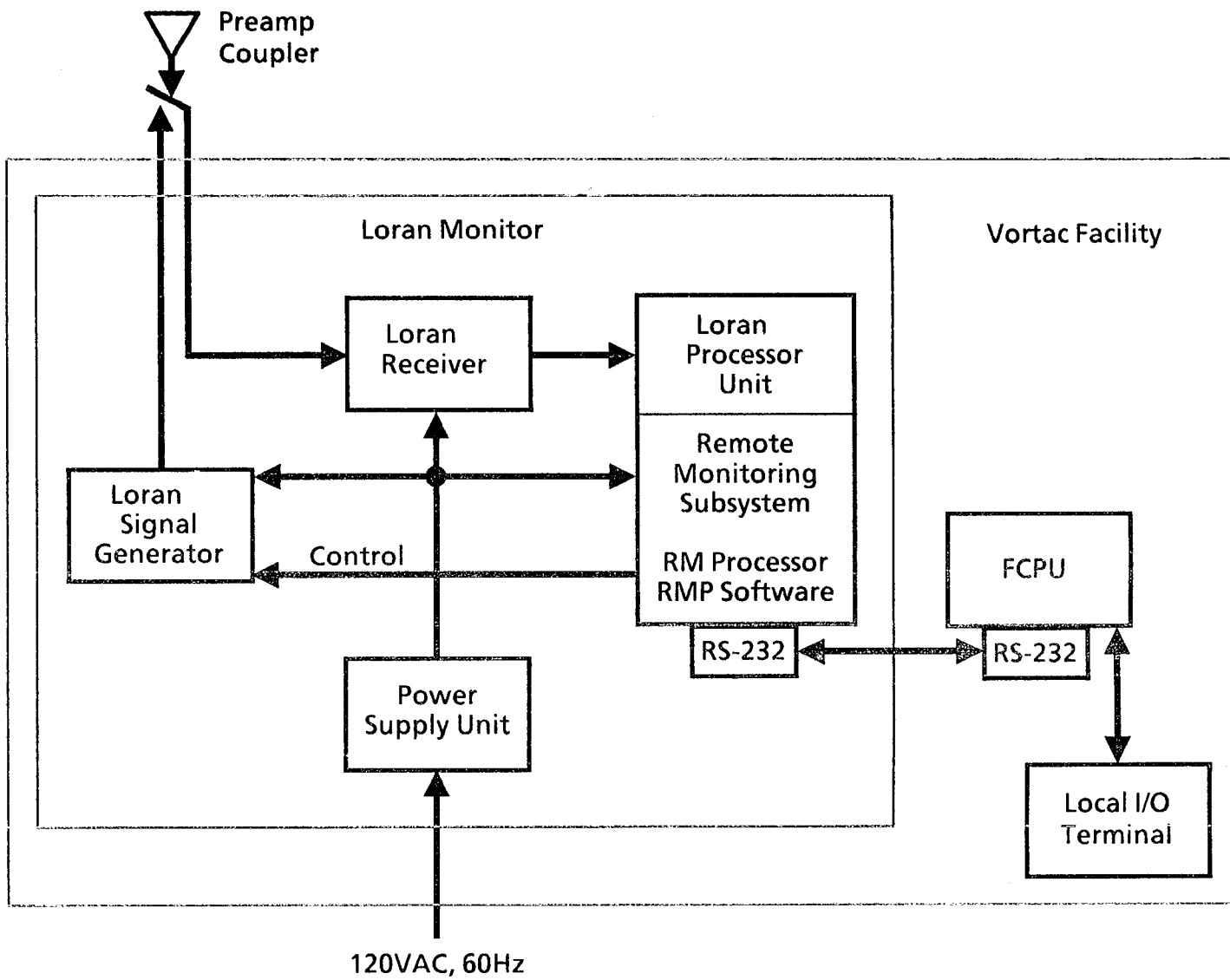
Each element will be discussed in the following paragraphs, and is illustrated in Figure 2.1, Functional Diagram of Loran Monitor.

(1) Loran Antenna and Coupler. The receiver antenna shall be a 3 meter whip antenna. The loran signals are received by the antenna and inserted into the coupler and passed to the receiver via a cable.

(2) Loran Receiver. The loran receiver receives low-frequency (100 KHz) signals from the antenna/coupler and processes the signals to calculate the time differences (TD's), signal-to-noise ratios (SNR), loss of signal, signal blink, and envelope-to-cycle difference (ECD). These data are then provided as an output to the loran processor.

(3) Loran Processor. The loran processor receives digital data on signal parameters from the receiver. The values of these parameters are then compared to predetermined standard values for that location. If all values fall within the allowable limits, the processor outputs a positive indication to the RMS board. If one or more values fall outside of the allowable limits, the processor delivers an out-of-tolerance alarm indication to the RMS.

FIGURE 2-1 FUNCTIONAL DIAGRAM OF LORAN MONITOR



(4) Remote Monitoring Subsystem. The RMS receives data from the loran processor and provides an output to the FCPU and to memory. Status data are routed through an EIA RS-232C port to the FCPU in the VOR. Signal parameter data are averaged and stored in non-volatile memory. Upon request from the FCPU, this signal quality history will be sent to the FCPU and then to point at the National Flight Data Center. These data will be used to create a historical data base and to validate the mathematical model used to predict calibration values published with approach procedures. Data are also collected on the time and cause of all alarm conditions.

(5) Signal Generator. The Signal Generator is capable of simulating various loran signals on command. The generator signal can be set for a specific group repetition interval (GRI), SNR, TDs (normal and fault), ECD, and blink signal. The antenna signal will be switched, on command, via the RMS or via a local maintenance terminal connected through the front panel port; one of the pre-set signal conditions from the generator will then be inserted at the input to the antenna coupler.

(6) Power Supply. The monitor unit shall operate separately from a single-phase, two-wire plus ground 120 volt, 60 hertz power source.

21. EXTERNAL INTERFACES.

a. The loran monitor interface with the FCPU in the VOR will be via an EIA RS-232C interface on the back panel of the loran monitor. Data transfer will be serial at a 1200 bits per second rate. The loran monitor can be accessed from the RMC-F and IOT of the VOR system through this interface. Data can be accessed from these terminals and remote certification can be accomplished by activating the signal generator. Note that this interface is an interim interface. A final interface to the MPS in accordance with NAS-DD-1000B will still be implemented when the VOR systems is upgraded to interface to the MPS.

b. There is a second EIA RS-232C port on the front panel of the monitor for access by technicians at the VOR facility.

22. MAINTENANCE CONCEPT.

a. The loran monitor will be supported by two levels of maintenance - site and depot. During the first year of operation, the depot level maintenance will be performed by the loran monitor contractor and onsite maintenance will be performed by Airway Facilities (AF) personnel. During the second year of operation and beyond, the depot level maintenance will be performed by the FAA Depot and onsite maintenance will be performed by AF personnel.

The status output of the loran monitor will be monitored by the VOR FCPU. After receipt of an alarm from the FCPU, and remote fault analysis, an AF technician will be dispatched to the VOR facility to repair the fault-causing condition. The technician will accomplish the repair and then return with the defective line replaceable unit (LRU). After return to the work center, the technician will send the faulty LRU to the depot for disposition.

b. Following a loran monitor maintenance failure, the alarm indicator at the Remote Maintenance and Control Unit (RMC-F) will be extinguished only after restoration of loran monitor service. For signal tolerance alarms, a selectable provision will permit automatic restoration to normal operation when all preset parameters have been met. For maintenance alarms, restoration of service will require recertification by an AF technician.

23. SOFTWARE PHILOSOPHY.

a. The loran monitor is microprocessor controlled. The VOR FCPU serves as the interface between a local or remote operator and the loran monitor. In addition, an input/output terminal can be connected via a EIA RS-232C port directly to the loran processor by a local operator. The loran processor issues maintenance alarms and system out tolerance alarms when critical parameters are out of tolerance. The controlling microprocessor for the loran processor is the Intel 80C88.

b. Detailed flow charts or program design language (PDL), a program listing in the C language, and program design specification are to be provided for all loran monitor software. Reprogramming of the firmware will be controlled on a system basis with National Airway Engineering Field Support Sector (ASM-150) providing the reprogrammed read only memory devices when required.

24.-29. RESERVED.

SECTION 3. PROGRAM FUNDING

30. GENERAL. The implementation of the loran monitor project is in the Department of Transportation supplemental program monitoring list. A quarterly report on project funding status is presented to the Office of the Secretary of Transportation. Procurement of the loran monitor equipment is not covered under DOT Order 4200.9 or FAA Order 1810.1D, Major Systems Acquisition, because of the low monetary cost of the loran monitor procurement. While the equipment specifications are new, the principle monitor modules will make extensive use of off-the-shelf components. The loran receiver design has been available commercially for several years and an early implementation program has demonstrated similar monitors.

31. PROGRAM FUNDING STATUS. A contract award for the procurement of the loran monitors occurred October 16, 1986 in the amount of \$2,379,698. This contract includes procurement of 102 loran monitors, 10 spares, initial spare parts provisioning, and a one year warranty covering depot level repair. Also included were options to buy engineering support services for installation and maintenance, maintenance training, and an additional 100 monitors for the mid continent signal gap. The options were funded with FY 87 funds. Estimated total contract value is \$4,819,206.

32. BUDGET SUBMISSION REQUIREMENTS. Budget submission requirements have all been met by prior year activity. This is evidenced by the full funding already issued. No future budget submissions for major equipment purchases are anticipated.

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12/12/88

33.-39. RESERVED.

SECTION 4. PROGRAM SCHEDULE AND STATUS

40. GENERAL. The loran monitor project was established for the procurement, installation, certification, operational turnover, warranty maintenance, and technical training course development for new equipment. The installation schedule gives priority to areas with high SNR and low Geometric Dilution of Precision in order to minimize certification problems. All loran monitors will be collocated at VOR facilities to reduce project costs. Appendix 1, Delivery Schedule, lists the equipment sites and installation schedule. This schedule will be updated periodically to allow flexibility to respond to FAA and contractor schedule requirements.

41. PRODUCTION FACTORS.

- a. A milestone schedule summary is provided in Table 2-1.

TABLE 2-1 MILESTONE SCHEDULE SUMMARY

Contract Award	10/86
Equipment Delivery	
Start	5/89
Completion	6/90
Operational Readiness Demonstration (ORD)	
Start	1/90
Completion	10/90
Contract Options Exercised	
Training	3/88
System Users Guide	2/87
Additional Units	2/87

b. Commissioning of each loran aviation monitor will follow installation of the new equipment, completion of system checks, and notification. Flight check of the new equipment will not be required, however, each non-precision standard instrument approach based on the monitor will be flight checked. Certification of the new equipment will take place after 24 weeks of operational data have been collected by the monitor. These data are necessary to provide the TD correction values necessary to support a non precision SIAP.

42. SUPPORT FACTORS.

a. Two training media will be provided. A formal course will provide maintenance training of the loran monitor for the Airway Facilities technicians. This course will be 40 hours long and require the prerequisite of being a VOR certified technician. The other medium, a video program, will provide general loran concepts and operating characteristics of the loran monitor for field managers. The maintenance course will use traditional lecture and laboratory

training methods. The first five classes will be conducted by the contractor at his facility in Stillwater, Oklahoma. The contractor will provide draft training materials for FAA review, a reproducible copy of the final course training material, and instructor guides for both courses. The contractor will provide student training materials and performance examinations for the contractor taught courses. The FAA Academy will develop follow-on courses and schedules based on the contractor courses.

b. Test equipment will not be furnished to the site level. The loran signal generator included in each monitor is built-in test equipment. If it is determined that additional special test equipment is required to support the loran monitor at depot level, it will be procured with project funds.

c. Logistics support is to be developed and conducted in accordance with the National Airspace Integrated Logistics Support (NAILS) Maintenance Plan for loran aviation monitors. This document calls for two levels of maintenance for the loran monitor, onsite maintenance and depot level repair. The first year of depot level support is to be performed by the contractor under the terms of the loran monitor contract.

d. Copies of instruction books will be provided and delivered with each system. These instructions will be reviewed in both preliminary and camera ready copy form by the FAA for adequacy as a field reference prior to acceptance as a deliverable item. Regional offices, sector offices, and the FAA Depot are to be provided copies of the instruction books.

e. All installation and depot maintenance requirements will be met by the contractor for the first year after the new equipment is accepted. Each region will supply a technical officer's representative to open the VOR facility for the contractor's installation team and conduct joint acceptance testing.

43.-49. RESERVED.

SECTION 5. PROGRAM MANAGEMENT

50. GENERAL. The loran monitor acquisition program has been implemented in accordance with the latest Federal Aviation Administration (FAA) policies and procedures for acquisition of equipment. This section defines the tasks and responsibilities of FAA headquarters, support and regional division organizations, and the equipment contractor for production, deployment, and operation of the loran monitor. Table 2-2, Program Management Organizations and Responsibility, covers specific FAA organizations and their responsibilities.

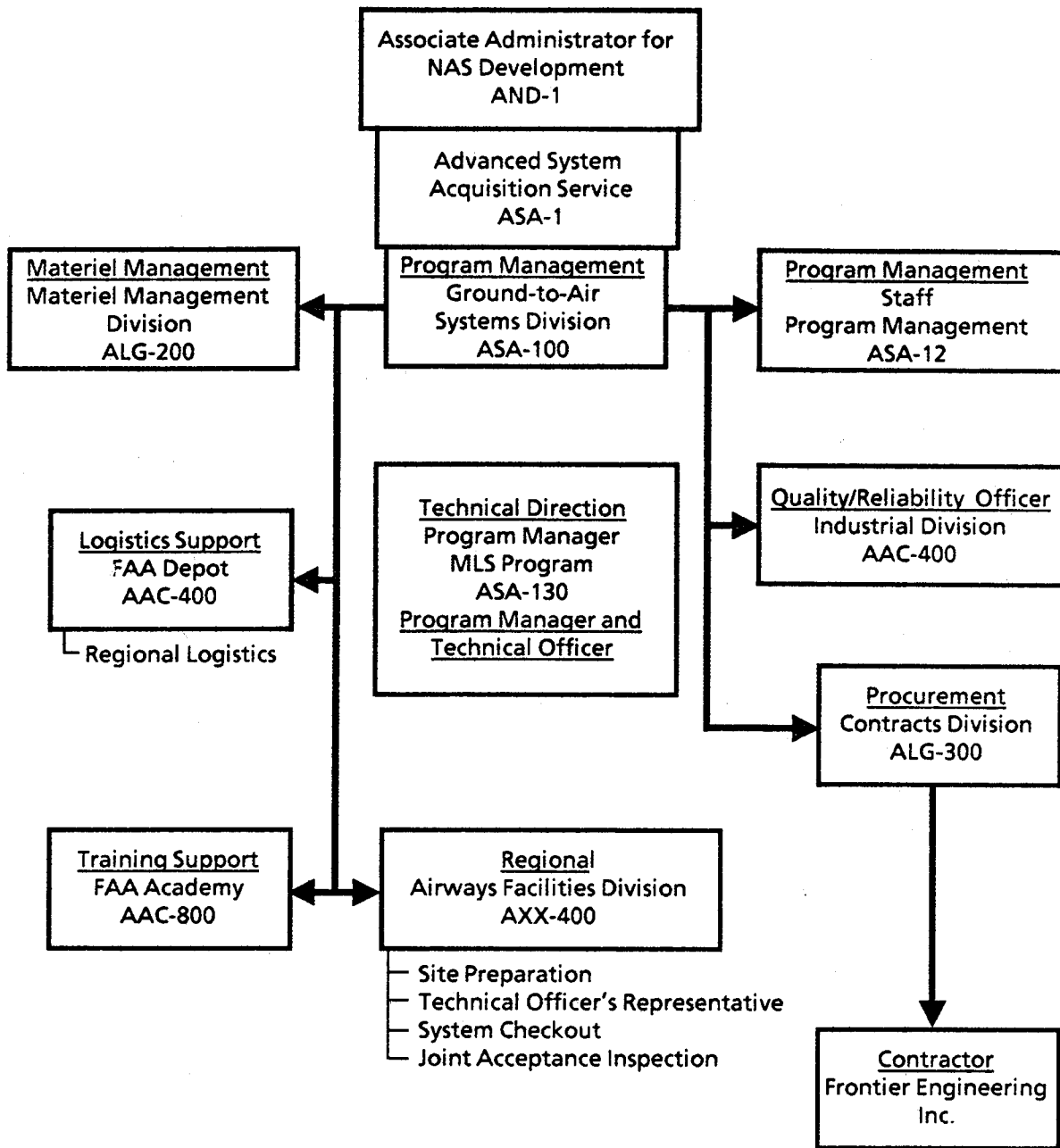
51. MANAGEMENT APPLICATION. The Director, Advanced System Acquisition Service (ASA-1) has assigned responsibility for technical management of the loran monitor acquisition program to a program manager and staff engineers selected from the staff of the Microwave Landing System (MLS) Branch (ASA-130) of the Ground-to-Air Systems Division (ASA-100). Technical program management includes coordination of FAA headquarters activities, system engineering, and system deployment. Major FAA headquarters responsibilities include program management, system engineering, procurement, system certification, personnel requirements, test equipment, logistics, training, and implementation. The Associate Administrator for Airway Facilities (AAF-1) will be responsible for development of the National Field Support Group (NMSG) to provide second-level engineering support for the loran monitor program. The following headquarters organizations have specific tasks related to loran monitor program implementation:

a. MLS Branch (ASA-130). The program manager and staff engineers were selected from the staff of ASA-130. Their duties are as follows:

(1) The program manager has the primary responsibility for acquisition and implementation of a cost-effective loran monitor program that can be operated and supported with available resources. This includes overall responsibility for design, development, testing, evaluation, production, and deployment of loran monitor equipment.

(2) Staff engineers are responsible to the program manager for system engineering and technical management for specific portions of the loran monitor program. These responsibilities include fiscal and progress status reporting in assigned areas. The staff engineers will furnish technical information to other organizations as required, and monitor and evaluate the loran monitor equipment contractor for compliance with the requirements of the specification. As the program progresses, this staff will be tailored to support program requirements.

FIGURE 2-2. PROGRAM MANAGEMENT STRUCTURE



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b. Maintenance Engineering Division (ASM-100). ASM-100 is responsible for determination of loran monitor equipment maintenance requirements. These requirements include amount of support equipment needed, level of logistics support, and certification of equipment. ASM-100 has been assigned as item manager for loran monitor test equipment.

c. Performance Analysis Program (ASM-110). ASM-110 will be responsible for establishing Airway Facilities (AF) training requirements. ASM-110 is also responsible for personnel certification requirements.

d. Planning and Budgetary Program (ASM-230). ASM-230 is responsible for establishing staffing standards for the loran monitor program so that the systems can be adequately operated and supported.

e. Communication/Nav aids Branch (ALG-320). ALG-320 is responsible for the award and administration of contracts, procurement of equipment, and designation of a contracting officer (CO). The CO, with guidance and support from the quality and reliability officer (QRO) and the project engineer and project engineers, is responsible for technical contract management.

f. Materiel Systems Branch (ALG-220). ALG-220 will establish logistics support and material requirements for the loran monitor system. The logistics system established will provide support to the program in accordance with the maintenance concept. ALG-220 will also coordinate loran monitor program logistics requirements with the FAA Depot (AAC-400).

g. The Program Plans and Requirements Branch (APT-330) will prepare the contract option for training based upon the plan for training approved by APT-310 and will exercise this option. The contractor's progress in developing the training will be monitored and evaluated by APT-330 or an assigned contract officer's technical representative (COTR).

52. FAA SUPPORT ORGANIZATIONS. The Mike Monroney Aeronautical Center (AAC) will provide both maintenance and training support for the loran monitor system. The FAA Depot is responsible for provisioning, supply support, and the development and management of Depot-level maintenance after expiration of the contractor's warranty period. The FAA Academy is responsible for providing training for maintenance personnel and developing courses for management training related to the system.

a. FAA Regions. The AF division of each FAA region installing loran monitor equipment is responsible for equipment checkout, certification, and acceptance. These activities will conform to the

requirements of the latest revision of the loran monitor installation standards handbook. Maintenance in accordance with the manufacturer's maintenance manual is the responsibility of AF sector personnel. Maintenance will be carried out in accordance with the remote maintenance monitoring concept and the maintenance standards handbook.

b. Central Data Collection Facility. Responsibility for the collection and processing of data from the loran monitors is the responsibility of AVN. The data will be used to validate the TD correction values for the 56 day update of the loran nonprecision SIAP's.

c. Contractor Support. The contractor will design, develop, qualify, manufacture, and install the loran monitor equipment in accordance with all applicable technical and contractual requirements for this equipment. In addition to supplying the specified equipment, the contractor is responsible for the following items related to proper support of the program:

(1) Instruction manuals with contents as required by the latest revision of specifications FAA-D-2494b; Technical Instruction Book Manuscripts; Technical Equipment and Systems Requirements; will be provided with production equipment. The contractor will be required to furnish revisions or updates to the Government when equipment, maintenance, or operational changes are approved.

(2) Provisioning documentation will be supplied in accordance with the latest revision of specification FAA-G-1210, Provisioning Technical Documentation. This documentation will be delivered in accordance with contractually established documentation delivery schedules.

(3) Reliability and maintainability programs in accordance with applicable paragraphs of specification FAA-G-2100e, Electronic Equipment, General Requirement; appropriate military specifications; and the loran monitor maintenance concept will be provided. The contractor will provide reliability and maintainability program plans as part of this requirement.

(4) Test plans and procedures will be provided for FAA approval. These tests will ensure that the equipment meets or exceeds the operational, quality assurance, reliability, maintainability, and failsafe provisions of the specification.

(5) Spares and module printed-circuit boards for the loran monitor will be provided at the rate of one set of spares per site. Any additional spares required by the latest revision of specification FAA-G-1375b, Spare Parts-Peculiar for Electronic, Electrical, and Mechanical Equipment; or by the specification, will also be supplied.

TABLE 2-2. PROGRAM MANAGEMENT ORGANIZATIONS AND RESPONSIBILITY.

ORGANIZATION	RESPONSIBILITY
ASM-130 Planning & Budgetary Program	Establish staffing standards for the loran monitor program.
ALG-320 Communication/Nav aids Research	Award and administration of contracts, procurement of equipment, and designation of a CO who is responsible for technical contract management.
ALG-220 Materiel Systems Branch	Establish logistics support and material requirements for the loran monitor system. Coordinate loran monitor program logistics requirements for the FAA Depot.
APT-300 Training Program Division	Will assist in the development of the training plan and coordinate training with the contractor and AAC-900.
APT-310 Technical Training Branch	Assist in training development and continually monitor and evaluate the training program once the final training program is established.
APT-330 Program Plans & Rqmts. Branch	Prepare and exercise the contract option if required, for training based upon the plan for training approved by APT-310.
AAC Mike Monroney Aeronautical Center	Provide maintenance material support through the FAA Depot (AAC-400).
AAC-400 Depot	Provide logistics support and a FAA program for improving the quality of engineering and repair, and repair and replacement services through the Electronic Production Section (AAC-442).
ASA-100 Ground-to-Air Systems Division	Technical management of the loran monitor acquisition program.

ORGANIZATION	RESPONSIBILITY
ASA-130 MLS Branch Program Manager	Acquisition and implementation of a cost effective program that can be operated and supported with available resources.
Staff Engineers	System engineering and technical management for specific portions of the program including fiscal and progress status reporting in assigned areas. Furnish technical information to other organizations as required and monitor and evaluate the loran monitor equipment contractor for compliance with the requirements of the specification. Establish and maintain the functional and transition baselines for the loran monitor.
ASM-100 Maintenance Engineering Division	Determination of loran monitor equipment requirements including amount of support equipment needed, level of logistics support, and certification of equipment. Update all site drawings and maintain the site baseline.
ASM-110 Performance Analysis Program	Establishing Airway Facilities (AF) training requirements and personnel certification requirements.
AXX-400 Regional AF Division	Provides Technical Onsite Representative (TOR) to monitor contractor installation of loran monitor equipment and to install Loran/VOR interface card in FCPU card cage. TOR responsible to ALG-320 during contract performance. Provides necessary onsite maintenance after monitor installation and JAI.
53.-59. <u>RESERVED.</u>	

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CHAPTER 3. PROJECT IMPLEMENTATION PLAN

SECTION 1. FIELD DEPLOYMENT

60. CONSTRUCTION MANAGEMENT PLAN. There is no construction involved in the loran monitor project. However, the Southwest and Northwest Mountain Regions should be aware of the support they will be providing to the United States Coast Guard for the loran transmitters. Details of the required support are covered in the Memorandum of Agreement between the FAA and the USCG, dated June 13, 1986.

61. INSTALLATION PLAN. Installation of loran monitor equipment in VOR sites will be done by the contractor. This is being coordinated with the responsible headquarters offices. The installation order(s) containing specific guidelines will be prepared for issue by ASA-1 in accordance with the schedule in appendix 1. Each region will supply a TOR for the duration of the installation period.

62. CONFIGURATION MANAGEMENT PLAN.

a. Configuration Management for the loran monitor will involve three levels; a functional baseline, a transition baseline, and a site baseline. The three levels, and the party with overall responsibility for each level, will be explained in the following paragraphs.

b. The Functional Baseline for the loran monitor deals with system level performance requirements of the NAS. This determines the quantities, locations, interface definitions, specific equipment functions, and transition strategy. The project manager, ASA-130, is responsible for developing and implementing the functional baseline. The equipment specification, FAA-E-2762, has been approved by a specification review board, and is currently under formal configuration management.

c. The Transition Baseline for the loran monitor deals with the implementation of equipment into the field. It insures that the project is coordinated throughout the NAS, so that it can be delivered, integrated, and tested without disrupting other NAS systems. The project manager, ASA-130, is responsible for developing the transition baseline. A case file has been written which covers loran monitor transition requirements.

d. The Site Baseline is currently under configuration management on a site-by-site basis for the VOR sites. This is an ongoing activity for the operational life of the equipment, and the changes required to install the loran monitor into VOR sites, to include hardware and software, must be documented as part of the acceptance procedure.

63.-69. RESERVED.

SECTION 2. PROGRAM RESPONSIBILITIES

70. GENERAL. The loran aviation monitor program has been implemented in accordance with present FAA policy and procedures for the acquisition of equipment. The Advanced System Acquisition Service (ASA) has the overall program responsibility. ASA provides program management and technical direction at the national level. The Acquisition and Materiel Service (ALG) is the procuring office for FAA headquarters procurements and provides quality/reliability officer services at the equipment contractor's facility. ALG also coordinates onsite project materiel and service procurements for the regions. The Mike Monroney Aeronautical Center (AAC) will establish logistic support services for the system which will include module repair capability.

71. FAA HEADQUARTERS. The MLS Branch, ASA-130, of the Ground-to-Air Systems Division, ASA-100, has been assigned the role of technical program manager. Thus, ASA-130 is the focal point for FAA headquarters activity and is responsible for systems engineering.

a. A project manager has been designated within the ASA-130 staff and will serve as the technical officer (TO) for the headquarters equipment procurement. Major FAA headquarters' responsibilities include program management, system engineering, procurement and establishing requirements for personnel and equipment certification, test equipment, logistics, and implementation.

(1) System requirements shall be consistent with the NAS system specification NAS-SS-1000 and, in general, are established as a result of the continuing planning and budgeting process of the FAA. Requests for NAS system expansion and modernization originate from many sources. These programs or project requests are subjected to a series of increasingly more detailed planning cycles and reviews until all the funds are budgeted after Congressional review and approval. System requirements for the loran aviation monitor program include equipment specifications prepared by the Advanced System Acquisition Service, and target schedules and budgets.

(2) Primary program management responsibilities include planning, coordination, and fiscal and physical status accounting and reporting.

(3) FAA headquarters organizations having program management responsibilities include:

- (a) ASA-1 - Director, Advanced System Acquisition Service.
- (b) ASA-10 - Program Management Branch.
- (c) ASA-100 - Ground-to-Air Systems Division.
- (d) ASE-200 - Configuration Management Division.

b. Program Support for the Loran-C aviation monitor program is the responsibility of ASA-100. This includes establishing and maintaining equipment specifications, technical support to the contracting officer, test equipment, logistics, and maintenance analysis.

(1) Providing technical information to other organizations is an ASA-100 responsibility. As the equipment procurement progresses, the equipment contractor will be a major source of this information which will include instructions for equipment installation, system checkout, calibration, and operation. This other technical data will be made available to support the regional engineering activities. ASA-130 will be responsible for the adequacy and accuracy of the technical information supplied to the regions.

(2) Equipment contractor technical monitoring is the responsibility of ASA-100 during the design and developing phase of the contract. Scheduled design reviews at the contractor's facility and detailed review of contractually required technical data submitted for FAA concurrence provide data for contract performance appraisal. ASA-130 will provide technical support to the quality/reliability officer (QRO) during factory acceptance and demonstration test performance and evaluation. ASA-130, acting as the T0, is specifically responsible to the contracting office for contractor technical performance evaluation and reporting when equipment performance or contract schedule requirements may be impacted.

(3) Site technical support is provided by ASA-130 as required and available. During installation, checkout, and certification, ASA-130 maintains technical cognizance of overall engineering activities.

(4) Maintenance analysis will be performed by the Technical Standards Program, ASM-120, which is responsible for determining equipment maintenance requirements including support equipment, logistics levels, and certification of both equipment and personnel. ASM-120 will coordinate these requirements with ASA-130 and other organizations. Affected organizations are:

(a) ASA-130 - MLS Branch.

(b) ASM-120 - Technical Standards Program.

c. Procuring office for all national buys is the Acquisition and Materiel Service, ALG. The Contracts Division, Communication/NAVAIDS Branch, ALG-320, has contract responsibility, with ALG-322 designated as the contracting officer (CO). To assist the CO in technical evaluation of responses to the equipment contract request for proposal, a technical proposal evaluation team was designated. The team was staffed with representatives from various organizations to provide a broad range of experience necessary for technical proposal evaluation. Subsequent to contract award, the TO and QRO were assigned to assist the CO in technical contract administration. Affected organizations are:

(1) ALG-320 - Communication/NAVAIDS Branch.

(2) ALG-410 - Industrial Evaluation Branch.

(3) ASA-130 - MLS Branch.

(4) AGC-540 - General Contracts Branch.

d. Ensuring that logistic support material requirements are established is the responsibility of the Acquisition and Materiel Service, Materiel Management Division, Materiel Systems Branch, ALG-220. Affected organizations are:

(1) ALG-220 - Materiel Systems Branch,

(2) ASM-120 - Technical Standards Program.

(3) ASA-130 - MLS Branch.

e. Establishing staffing standards is the responsibility of the Maintenance Engineering Program, ASM-120. Affected organizations are:

(1) ASM-120 - Technical Standards Program.

(2) ASA-130 - MLS Branch.

f. The FAA Depot, AAC-400, located in Oklahoma City, Oklahoma, will provide logistics engineering support, including establish and maintaining a spares inventory and providing for the repair of returned modules. Affected organizations are:

- (1) AAC-442 - Electronic Production Section.
- (2) AAC-445 - Engineering Section.
- (3) AAC-485 - NAS Project and Provisioning Section.

g. The FAA Academy, AAC-900, located in Oklahoma City, Oklahoma, as technical training center, is responsible for training in the following areas:

- (1) AAC-940 - Maintenance Technicians and Engineers.
- (2) AAC-930 - Air Traffic Controllers.

h. The FAA Technical Center, ACT-140, located in Atlantic City, New Jersey will provide test engineering support, including development of test plans and actual NAS Integration testing.

72. FAA REGIONS. All FAA regions, with the exception of the European region, are responsible for assigning a technical officer's representative for the loran aviation monitor systems during the turnkey installation program. Onsite maintenance is the responsibility of AF sector personnel.

a. Project implementation is the responsibility of the Airway Facilities division of each region for the affected sites. Implementation activities include site preparation, installation and checkout, and certification. Specific activities will include the following:

- (1) Site engineering is the responsibility of the regions for normal engineering activities required for site support.
- (2) Site preparation prior to equipment delivery, acceptance inspection, and performance certification; is a regional responsibility in accordance with FAA headquarters-provided guidance and instructions. An installation handbook will be provided by February 1988.
- (3) Joint acceptance inspections (JAI) will be conducted by a joint acceptance board established by each region. The board will be responsible for inspection of, and concurrence with, all physical equipment and documentation. The purpose of the JAI is to ensure that the facility and equipment are acceptable for commissioning.

b. Affected Organizations. The primary responsibility for the loran aviation monitor system is the regional Airway Facilities division of the affected regions. This division is responsible for regional implementation plans and defining organization responsible within each region, in accordance with FAA headquarters provided guidance and instructions.

73. CONTRACTOR. The contractor is to design, develop, qualify, manufacture and install loran aviation monitor equipment in accordance with the technical requirements of Specification FAA-E-2762, and the contractual requirements of the solicitation. In addition to supplying the equipment specified, the contractor is responsible for the following:

a. Instruction manuals in accordance with FAA-D-2494/b dated March 14, 1984, are required.

b. Provisioning documentation in accordance with FAA-G-1210c is required.

c. A reliability and maintainability program and program plan to demonstrate the requirements of the specification are required in accordance with MIL-STD-781C and MIL-STD-471A.

d. Test plans and procedures will be provided for FAA approval.

74.-79. RESERVED.

SECTION 3. COMMUNICATIONS

80. GENERAL. The loran monitor program manager, ASA-130, is the focal point for all internal program communication. In order to successfully proceed with the system deployment and operational cutover, ASA-130 must be aware of all significant program activities. The program manager must ensure that necessary program information is available to the organization that has action responsibility. ASA-130 will maintain a series of program information distribution lists. These lists will be maintained by functional organization to either the branch or section level, as appropriate. Each responsible organization will designate a key contact for the loran monitor project. Those designated will be identified by name, organization code, and telephone number. When appropriate, an alternate will be named.

81. FAA HEADQUARTERS. In accordance with FAA policy, interface with, and communication to contractors is authorized for specific purposes. The contracting officer has direct contractual responsibility and is responsible for all contractual matters. The CO is solely authorized to approve changes that will impact price, delivery, or schedule.

a. Contracting Officer has been designated in ALG-320. As such, ALG-320 is the office responsible for all contractual matters.

b. Program Manager has been designated in ASA-130. The ASA-130 Project Manager is also the Technical Officer. As such, ASA-130 is authorized to perform technical interface with the contractor's representatives.

c. Quality/Reliability Officer was assigned in ALG-400 upon contract award. The QRO is the FAA's representative at the contractor's facility and is primarily concerned with quality and reliability issues. The QRO is directed by FAA policy and procedure, and by the terms and conditions of the contract.

82. FAA REGIONS. The regions will communicate with FAA headquarters to verify that the implementation schedule in Section 61, Installation Plan, is current, and to schedule their technicians for the loran monitor training course.

83. CONTRACTOR. In accordance with FAA policy, interface with and communications to contractors are authorized for specific purposes. The contracting officer (CO) has the direct contract responsibility and is responsible for all contractual matters. The CO is the only one authorized to approve changes that will impact price, delivery, or schedule.

a. The contracting officer (CO) has been designated in ALG-320. As such, ALG-322 is the office responsible for all contractual matters.

b. The program manager has been designated as the Manager, ASA-130. A project manager has been designated from the ASA-130 staff. He is also the technical officer (TO). Thus, ASA-130 is authorized to perform interface with the contractor's representatives.

c. The quality/reliability officer (QRO) has been designated from ALG-130. The QRO is the FAA's representative at the contractor's facilities and is primarily concerned with quality and reliability issues. The QRO is directed by FAA policy and procedure and by the terms and conditions of the contract.

d. The equipment contractor has designated specific individuals in the contractor organization to act in corollary positions to those listed above.

84.-89. RESERVED.

SECTION 4. ACCEPTANCE INSPECTION

90. GENERAL. Upon completion of installation, the contractor will conduct a shakedown test to make the adjustments needed to ensure a properly operating loran monitor. When the shakedown test is completed, the system will be operated in an energized state for 48 consecutive hours. Also a joint physical inspection will be made by the FAA and contractor after the equipment is installed. A list of the discrepancies will be provided to the contractor by the FAA. These physical discrepancies will be corrected during the 48-hour run, but no equipment adjustments will be made. Any additional restoration or touchup will be made during this time. Following the 48-hour run, a functional test of the entire system will be made.

91. CONTRACT ACCEPTANCE INSPECTION. The acceptance procedure will be a subset of the factory functional acceptance tests, supplemented with tests that can only be performed on site. The test plan will be developed by the contractor and approved by ASA-130. Successful completion of this test, and verification that the equipment installation is in accordance with drawings supplied by the FAA, will result in FAA system acceptance from the contractor. (Drawings are to be signed, dated, and returned to ASM-100.) The FAA Form 256, Contractor Acceptance, will then be completed and forwarded to the Airway Facilities sector.

92. JOINT ACCEPTANCE INSPECTION. A joint acceptance inspection (JAI) will be completed prior to assumption of maintenance responsibility by the Airway Facilities sector. JAI will be conducted per FAA Order 6030.45, Facility Reference Data File. Concurrent over-the-shoulder inspection during contractor acceptance testing is encouraged but must be coordinated so that no Government-caused delay to contractor completion occurs.

6860.1

12/12/88

93.-99. RESERVED.

12/12/88

6860.1
APPENDIX 1

APPENDIX 1: DELIVERY SCHEDULE

- A) BY DATE
- B) BY REGION

12/12/88

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
1		FAA TEC CENTER	NJ	CT	9 / 88	FEI
2		FAA DEPOT (ASM150)	OK	AC	9 / 88	FEI
3		FAA ACADEMY	OK	AC	5 / 89	FEI
4		FAA ACADEMY	OK	AC	5 / 89	FEI
5		FAA ACADEMY	OK	AC	5 / 89	FEI
6	BVO	BARTLESVILLE	OK	SW	5 / 89	ALL
7	MLC	MC ALESTER	OK	SW	5 / 89	ALL
8	ADM	ARDMORE	OK	SW	5 / 89	ALL
9	GAG	GAGE	OK	SW	5 / 89	ALL
10	HBR	HOBART	OK	SW	5 / 89	ALL
11	PAE	PAINE	WA	NM	6 / 89	1
12	EPH	EPHRATA	WA	NM	6 / 89	1
13	GEG	SPOKANE	WA	NM	6 / 89	1
14	MLS	MILES CITY	MT	NM	6 / 89	2
15	GGW	GLASGOW	MT	NM	6 / 89	2
16	ISN	WILLISTON	ND	GL	6 / 89	2
17	LWS	LEWISTON	ID	NM	7 / 89	1
18	BKE	BAKER	OR	NM	7 / 89	1
19	IMB	KIMBERLY	OR	NM	7 / 89	1
20	DLS	THE DALLES	OR	NM	7 / 89	1
21	UBG	NEWBERG	OR	NM	7 / 89	1
22	DIK	DICKINSON	ND	GL	7 / 89	2
23	MOT	MINOT	ND	GL	7 / 89	2
24	DVL	DEVILS LAKE	ND	GL	7 / 89	2
25	PMB	PEMBINA	ND	GL	7 / 89	2
26	FAR	FARGO	ND	GL	7 / 89	2
27	JMS	JAMESTOWN	ND	GL	7 / 89	2
28	MCG	MC GRATH	AK	AL	7 / 89	3
29	UNK	UNALAKLEET	AK	AL	7 / 89	3
30	ENM	EMMONAK	AK	AL	7 / 89	3
31	HPS	HOOPER BAY	AK	AL	7 / 89	3
32	FYU	FORT YUKON	AK	AL	7 / 89	4
33	BTT	BETTLES	AK	AL	7 / 89	4
34	HSL	HUSLIA	AK	AL	7 / 89	4
35	OTZ	KOTZEBUE	AK	AL	7 / 89	4
36	RBG	ROSEBURG	OR	NM	8 / 89	1
37	LKV	LAKEVIEW	OR	NM	8 / 89	1
38	REO	ROME	OR	NM	8 / 89	1
39	BOI	BOISE	ID	NM	8 / 89	1
40	ATY	WATERTOWN	SD	GL	8 / 89	2
41	FSD	SIOUX FALLS	SD	GL	8 / 89	2
42	PIR	PIERRE	SD	GL	8 / 89	2
43	DPR	DUPREE	SD	GL	8 / 89	2
44	RAP	RAPID CITY	SD	GL	8 / 89	2
45	BET	BETHEL	AK	AL	8 / 89	3
46	AQH	QUINHAGAK	AK	AL	8 / 89	3
47	AKN	KING SALMON	AK	AL	8 / 89	3

12/12/88

6860.1
APPENDIX 1

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
48	CDB	COLD BAY	AK	AL	8 / 89	3
49	OME	NOME	AK	AL	8 / 89	4
50	YAK	YAKUTAT	AK	AL	8 / 89	4
51	BKA	BIORKA ISLAND	AK	AL	8 / 89	4
52	HOM	HOMER	AK	AL	8 / 89	4
53	TWF	TWIN FALLS	ID	NM	9 / 89	1
54	DBS	DUBOIS	ID	NM	9 / 89	1
55	LKT	SALMON	ID	NM	9 / 89	1
56	MSO	MISSOULA	MT	NM	9 / 89	1
57	FCA	KALISPELL	MT	NM	9 / 89	1
58	GCC	GILLETTE	WY	NM	9 / 89	2
59	RLY	WORLAND	WY	NM	9 / 89	2
60	DGW	DOUGLAS	WY	NM	9 / 89	2
61	CKW	CHEROKEE	WY	NM	9 / 89	2
62	EKR	MEEKER	CO	NM	9 / 89	2
63	FGT	FARMINGTON	MN	GL	9 / 89	3
64	FRM	FAIRMONT	MN	GL	9 / 89	3
65	TKA	TALKEETNA	AK	AL	9 / 89	4
66	ENN	NENANA	AK	AL	9 / 89	4
67	BIG	BIG DELTA	AK	AL	9 / 89	4
68	GKN	GULKANA	AK	AL	9 / 89	4
69	ORT	NORTHWAY	AK	AL	9 / 89	4
70	CTB	CUT BANK	MT	NM	10 / 89	1
71	HVR	HAVRE	MT	NM	10 / 89	1
72	LWT	LEWISTOWN	MT	NM	10 / 89	1
73	LVM	LIVINGSTON	MT	NM	10 / 89	1
74	BIL	BILLINGS	MT	NM	10 / 89	1
75	HBU	GUNNISON	CO	NM	10 / 89	2
76	ALS	ALAMOSA	CO	NM	10 / 89	2
77	LAA	LAMAR	CO	NM	10 / 89	2
78	IOC	KIOWA	CO	NM	10 / 89	2
79	AKO	AKRON	CO	NM	10 / 89	2
80	AXN	ALEXANDRIA	MN	GL	10 / 89	3
81	BJI	BEMIDJI	MN	GL	10 / 89	3
82	HIB	HIBBING	MN	GL	10 / 89	3
83	PQI	PRESQUE ISLE	ME	NE	10 / 89	4
84	BGR	BANGOR	ME	NE	10 / 89	4
85	ENE	KENNEBUNK	ME	NE	10 / 89	4
86	BTB	BURLINGTON	VT	NE	10 / 89	4
87	PUT	PUTNUM	CT	NE	10 / 89	4
88	BPI	BIG PINEY	WY	NM	11 / 89	1
89	OGD	OGDEN	UT	NM	11 / 89	1
90	MTU	MYTON	UT	NM	11 / 89	1
91	HVE	HANKSVILLE	UT	NM	11 / 89	1
92	AIA	ALLIANCE	NE	CE	11 / 89	2
93	LBF	NORTH PLATTE	NE	CE	11 / 89	2
94	ONL	O'NEILL	NE	CE	11 / 89	2

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
95	OMA	OMAHA	NE	CE	11 / 89	2
96	IWD	IRONWOOD	MI	GL	11 / 89	3
97	AUW	WAUSAU	WI	GL	11 / 89	3
98	ODI	NODINE	MN	GL	11 / 89	3
99	BAE	BADGER	WI	GL	11 / 89	3
100	CMK	CARMEL	NY	EA	11 / 89	4
101	RKA	ROCKDALE	NY	EA	11 / 89	4
102	GEE	GENESEO	NY	EA	11 / 89	4
103	ETX	EAST TEXAS	PA	EA	11 / 89	4
104	JST	JOHNSTOWN	PA	EA	11 / 89	4
105	DTA	DELTA	UT	NM	12 / 89	1
106	ELY	ELY	NV	WP	12 / 89	1
107	BQU	BULLION	NV	WP	12 / 89	1
108	LOL	LOVELOCK	NV	WP	12 / 89	1
109	TKO	MANKATO	KS	CE	12 / 89	2
110	HLC	HILL CITY	KS	CE	12 / 89	2
111	ICT	WICHITA	KS	CE	12 / 89	2
112	MQT	MARQUETTE	MI	GL	12 / 89	3
113	SSM	SAULT STE MARIE	MI	GL	12 / 89	3
114	TVC	TRAVERSE CITY	MI	GL	12 / 89	3
115	MBS	SAGINAW	MI	GL	12 / 89	3
116	ERI	ERIE	PA	EA	12 / 89	4
117	MFD	MANSFIELD	OH	GL	12 / 89	4
118	AIR	BELLAIRE	OH	GL	12 / 89	4
119	HVQ	CHARLESTON	WV	EA	12 / 89	4
120	FJS	FORT JONES	CA	WP	1 / 90	1
121	RDD	REDDING	CA	WP	1 / 90	1
122	LTA	LAKE TAHOE	CA	WP	1 / 90	1
123	SGD	SCAGGS ISLAND	CA	WP	1 / 90	1
124	SNS	SALINAS	CA	WP	1 / 90	1
125	BGD	BORGER	TX	SW	1 / 90	2
126	TXO	TEXICO	TX	SW	1 / 90	2
127	GTH	GUTHRIE	TX	SW	1 / 90	2
128	BGS	BIG SPRING	TX	SW	1 / 90	2
129	SJT	SAN ANGELO	TX	SW	1 / 90	2
130	LFD	LITCHFIELD	MI	GL	1 / 90	3
131	DQN	DAYTON	OH	GL	1 / 90	3
132	VHP	INDIANAPOLIS	IN	GL	1 / 90	3
133	EON	PEOTONE	IL	GL	1 / 90	3
134	CAP	CAPITAL	IL	GL	1 / 90	3
135	ROA	ROANOKE	VA	EA	1 / 90	4
136	LIB	LIBERTY	NC	SO	1 / 90	4
137	GVE	GORDONSVILLE	VA	EA	1 / 90	4
138	SBY	SALISBURY	MD	EA	1 / 90	4
139	EJF	SHAFTER	CA	WP	2 / 90	1
140	BIH	BISHOP	CA	WP	2 / 90	1
141	TPH	TONOPAH	NV	WP	2 / 90	1

12/12/88

6860.1
APPENDIX 1

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
142	BTY	BEATTY	NV	WP	2 / 90	1
143	LAS	LAS VEGAS	NV	WP	2 / 90	1
144	RSG	ROCKSPRINGS	TX	SW	2 / 90	2
145	THX	THREE RIVERS	TX	SW	2 / 90	2
146	LRD	LAREDO	TX	SW	2 / 90	2
147	BRO	BROWNSVILLE	TX	SW	2 / 90	2
148	MZV	MOLINE	IL	GL	2 / 90	3
149	ALO	WATERLOO	IA	CE	2 / 90	3
150	IRK	KIRKSVILLE	MO	CE	2 / 90	3
151	TOP	TOPEKA	KS	CE	2 / 90	3
152	ISO	KINSTON	NC	SO	2 / 90	4
153	ELW	ELECTRIC CITY	SC	SO	2 / 90	4
154	VAN	VANCE	SC	SO	2 / 90	4
155	VNA	VIENNA	GA	SO	2 / 90	4
156	SAV	SAVANNAH	GA	SO	2 / 90	4
157	PSP	PALM SPRINGS	CA	WP	3 / 90	1
158	BZA	BARD	AZ	WP	3 / 90	1
159	BXK	BUCKEYE	AZ	WP	3 / 90	1
160	TUS	TUCSON	AZ	WP	3 / 90	1
161	IDU	INDUSTRY	TX	SW	3 / 90	2
162	ACT	WACO	TX	SW	3 / 90	2
163	LOA	LEONA	TX	SW	3 / 90	2
164	BUJ	BLUE RIDGE	TX	SW	3 / 90	2
165	TXK	TEXARKANA	AR	SW	3 / 90	2
166	SHY	SUNSHINE	MO	CE	3 / 90	3
167	FAM	FARMINGTON	MO	CE	3 / 90	3
168	CNG	CUNNINGHAM	KY	SO	3 / 90	3
169	SAM	SAMSVILLE	IL	GL	3 / 90	3
170	TAY	TAYLOR	FL	SO	3 / 90	4
171	ORL	ORLANDO	FL	SO	3 / 90	4
172	SRQ	SARASOTA	FL	SO	3 / 90	4
173	MIA	MIAMI	FL	SO	3 / 90	4
174	SJN	ST JOHNS	AZ	WP	4 / 90	1
175	INW	WINSLOW	AZ	WP	4 / 90	1
176	PGS	PEACH SPRINGS	AZ	WP	4 / 90	1
177	PGA	PAGE	AZ	WP	4 / 90	1
178	MLU	MONROE	LA	SW	4 / 90	2
179	LCH	LAKE CHARLES	LA	SW	4 / 90	2
180	HRV	HARVEY	LA	SW	4 / 90	2
181	JAN	JACKSON	MS	SO	4 / 90	2
182	EWO	NEW HOPE	KY	SO	4 / 90	3
183	LOZ	LONDON	KY	SO	4 / 90	3
184	TYS	KNOXVILLE	TN	SO	4 / 90	3
185	SYI	SHELBYVILLE	TN	SO	4 / 90	3
186	RMG	ROME	GA	SO	4 / 90	3
187	FMN	FARMINGTON	NM	SW	5 / 90	1
188	CIM	CIMARRON	NM	SW	5 / 90	1

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
189	ACH	ANTON CHICO	NM	SW	5 / 90	1
190	ONM	SOCORRO	NM	SW	5 / 90	1
191	ROW	ROSWELL	NM	SW	5 / 90	1
192	HLI	HOLLY SPRINGS	MS	SO	5 / 90	2
193	PBF	PINE BLUFF	AR	SW	5 / 90	2
194	ARG	WALNUT RIDGE	AR	SW	5 / 90	2
195	RZC	RAZORBACK	AR	SW	5 / 90	2
196	VUZ	VULCAN	AL	SO	5 / 90	3
197	MVC	MONROEVILLE	AL	SO	5 / 90	3
198	MAI	MARIANNA	FL	SO	5 / 90	3
199	DMN	DEMING	NM	SW	6 / 90	1
200	SFL	SALT FLAT	TX	SW	6 / 90	1
201	FST	FORT STOCKTON	TX	SW	6 / 90	1
202		FAA DEPOT	OK	AC	5 / 90	STOCK
203		FAA DEPOT	OK	AC	5 / 90	STOCK
204		FAA DEPOT	OK	AC	5 / 90	STOCK
205		FAA DEPOT	OK	AC	5 / 90	STOCK
206		FAA DEPOT	OK	AC	5 / 90	STOCK
207		FAA DEPOT	OK	AC	5 / 90	STOCK
208		FAA DEPOT	OK	AC	5 / 90	STOCK
209		FAA DEPOT	OK	AC	5 / 90	STOCK
210		FAA DEPOT	OK	AC	5 / 90	STOCK
211		FAA DEPOT	OK	AC	5 / 90	STOCK
212		FAA DEPOT	OK	AC	5 / 90	STOCK

12/12/88

6860.1
APPENDIX 1

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
2		FAA DEPOT (ASM150)	OK	AC	9 / 88	FEI
3		FAA ACADEMY	OK	AC	5 / 89	FEI
4		FAA ACADEMY	OK	AC	5 / 89	FEI
5		FAA ACADEMY	OK	AC	5 / 89	FEI
202		FAA DEPOT	OK	AC	5 / 90	STOCK
203		FAA DEPOT	OK	AC	5 / 90	STOCK
204		FAA DEPOT	OK	AC	5 / 90	STOCK
205		FAA DEPOT	OK	AC	5 / 90	STOCK
206		FAA DEPOT	OK	AC	5 / 90	STOCK
207		FAA DEPOT	OK	AC	5 / 90	STOCK
208		FAA DEPOT	OK	AC	5 / 90	STOCK
209		FAA DEPOT	OK	AC	5 / 90	STOCK
210		FAA DEPOT	OK	AC	5 / 90	STOCK
211		FAA DEPOT	OK	AC	5 / 90	STOCK
212		FAA DEPOT	OK	AC	5 / 90	STOCK

ALASKA REGION (AAL)

28	MCG	MC GRATH	AK	AL	7 / 89	3
29	UNK	UNALAKLEET	AK	AL	7 / 89	3
30	ENM	EMMONAK	AK	AL	7 / 89	3
31	HPS	HOOPER BAY	AK	AL	7 / 89	3
32	FYU	FORT YUKON	AK	AL	7 / 89	4
33	BTT	BETTLES	AK	AL	7 / 89	4
34	HSL	HUSLIA	AK	AL	7 / 89	4
35	OTZ	KOTZEBUE	AK	AL	7 / 89	4
45	BET	BETHEL	AK	AL	8 / 89	3
46	AQH	QUINHAGAK	AK	AL	8 / 89	3
47	AKN	KING SALMON	AK	AL	8 / 89	3
48	CDB	COLD BAY	AK	AL	8 / 89	3
49	OME	NOME	AK	AL	8 / 89	4
50	YAK	YAKUTAT	AK	AL	8 / 89	4
51	BKA	BIORKA ISLAND	AK	AL	8 / 89	4
52	HOM	HOMER	AK	AL	8 / 89	4
65	TKA	TALKEETNA	AK	AL	9 / 89	4
66	ENN	NENANA	AK	AL	9 / 89	4
67	BIG	BIG DELTA	AK	AL	9 / 89	4
68	GKN	GULKANA	AK	AL	9 / 89	4
69	ORT	NORTHWAY	AK	AL	9 / 89	4

CENTRAL REGION (ACE)

92	AIA	ALLIANCE	NE	CE	11 / 89	2
93	LBF	NORTH PLATTE	NE	CE	11 / 89	2
94	ONL	O'NEILL	NE	CE	11 / 89	2

12/12/88

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
95	OMA	OMAHA	NE	CE	11 / 89	2
109	TKO	MANKATO	KS	CE	12 / 89	2
110	HLC	HILL CITY	KS	CE	12 / 89	2
111	ICT	WICHITA	KS	CE	12 / 89	2
149	ALO	WATERLOO	IA	CE	2 / 90	3
150	IRK	KIRKSVILLE	MO	CE	2 / 90	3
151	TOP	TOPEKA	KS	CE	2 / 90	3
166	SHY	SUNSHINE	MO	CE	3 / 90	3
167	FAM	FARMINGTON	MO	CE	3 / 90	3

EASTERN REGION (AEA)

100	CMK	CARMEL	NY	EA	11 / 89	4
101	RKA	ROCKDALE	NY	EA	11 / 89	4
102	GEE	GENESEO	NY	EA	11 / 89	4
103	ETX	EAST TEXAS	PA	EA	11 / 89	4
104	JST	JOHNSTOWN	PA	EA	11 / 89	4
116	ERI	ERIE	PA	EA	12 / 89	4
119	HVQ	CHARLESTON	WV	EA	12 / 89	4
135	ROA	ROANOKE	VA	EA	1 / 90	4
137	GVE	GORDONSVILLE	VA	EA	1 / 90	4
138	SBY	SALISBURY	MD	EA	1 / 90	4

GREAT LAKES REGION (AGL)

16	ISN	WILLISTON	ND	GL	6 / 89	2
22	DIK	DICKINSON	ND	GL	7 / 89	2
23	MOT	MINOT	ND	GL	7 / 89	2
24	DVL	DEVILS LAKE	ND	GL	7 / 89	2
25	PMB	PEMBINA	ND	GL	7 / 89	2
26	FAR	FARGO	ND	GL	7 / 89	2
27	JMS	JAMESTOWN	ND	GL	7 / 89	2
40	ATY	WATERTOWN	SD	GL	8 / 89	2
41	FSD	SIOUX FALLS	SD	GL	8 / 89	2
42	PIR	PIERRE	SD	GL	8 / 89	2
43	DPR	DUPREE	SD	GL	8 / 89	2
44	RAP	RAPID CITY	SD	GL	8 / 89	2
63	FGT	FARMINGTON	MN	GL	9 / 89	3
64	FRM	FAIRMONT	MN	GL	9 / 89	3
80	AXN	ALEXANDRIA	MN	GL	10 / 89	3
81	BJI	BEMIDJI	MN	GL	10 / 89	3
82	HIB	HIBBING	MN	GL	10 / 89	3
96	IWD	IRONWOOD	MI	GL	11 / 89	3
97	AUW	WAUSAU	WI	GL	11 / 89	3
98	ODI	NODINE	MN	GL	11 / 89	3

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
99	BAE	BADGER	WI	GL	11 / 89	3
112	MQT	MARQUETTE	MI	GL	12 / 89	3
113	SSM	SAULT STE MARIE	MI	GL	12 / 89	3
114	TVC	TRAVERSE CITY	MI	GL	12 / 89	3
115	MBS	SAGINAW	MI	GL	12 / 89	3
117	MFD	MANSFIELD	OH	GL	12 / 89	4
118	AIR	BELLAIRE	OH	GL	12 / 89	4
130	LFD	LITCHFIELD	MI	GL	1 / 90	3
131	DQN	DAYTON	OH	GL	1 / 90	3
132	VHP	INDIANAPOLIS	IN	GL	1 / 90	3
133	EON	PEOTONE	IL	GL	1 / 90	3
134	CAP	CAPITAL	IL	GL	1 / 90	3
148	MZV	MOLINE	IL	GL	2 / 90	3
169	SAM	SAMSVILLE	IL	GL	3 / 90	3

NEW ENGLAND REGION (ANE)

83	PQI	PRESQUE ISLE	ME	NE	10 / 89	4
84	BGR	BANGOR	ME	NE	10 / 89	4
85	ENE	KENNEBUNK	ME	NE	10 / 89	4
86	BTB	BURLINGTON	VT	NE	10 / 89	4
87	PUT	PUTNUM	CT	NE	10 / 89	4

NORTHWEST MOUNTAIN REGION (ANM)

11	PAE	PAINE	WA	NM	6 / 89	1
12	EPH	EPHRATA	WA	NM	6 / 89	1
13	GEG	SPOKANE	WA	NM	6 / 89	1
14	MLS	MILES CITY	MT	NM	6 / 89	2
15	GGW	GLASGOW	MT	NM	6 / 89	2
17	LWS	LEWISTON	ID	NM	7 / 89	1
18	BKE	BAKER	OR	NM	7 / 89	1
19	IMB	KIMBERLY	OR	NM	7 / 89	1
20	DLS	THE DALLES	OR	NM	7 / 89	1
21	UBG	NEWBERG	OR	NM	7 / 89	1
36	RBG	ROSEBURG	OR	NM	8 / 89	1
37	LKV	LAKEVIEW	OR	NM	8 / 89	1
38	REO	ROME	OR	NM	8 / 89	1
39	BOI	BOISE	ID	NM	8 / 89	1
53	TWF	TWIN FALLS	ID	NM	9 / 89	1
54	DBS	DUBOIS	ID	NM	9 / 89	1
55	LKT	SALMON	ID	NM	9 / 89	1
56	MSO	MISSOULA	MT	NM	9 / 89	1
57	FCA	KALISPELL	MT	NM	9 / 89	1
58	GCC	GILLETTE	WY	NM	9 / 89	2

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
59	RLY	WORLAND	WY	NM	9 / 89	2
60	DGW	DOUGLAS	WY	NM	9 / 89	2
61	CKW	CHEROKEE	WY	NM	9 / 89	2
62	EKR	MEEKER	CO	NM	9 / 89	2
70	CTB	CUT BANK	MT	NM	10 / 89	1
71	HVR	HAVRE	MT	NM	10 / 89	1
72	LWT	LEWISTOWN	MT	NM	10 / 89	1
73	LVM	LIVINGSTON	MT	NM	10 / 89	1
74	BIL	BILLINGS	MT	NM	10 / 89	1
75	HBU	GUNNISON	CO	NM	10 / 89	2
76	ALS	ALAMOSA	CO	NM	10 / 89	2
77	LAA	LAMAR	CO	NM	10 / 89	2
78	IOC	KIOWA	CO	NM	10 / 89	2
79	AKO	AKRON	CO	NM	10 / 89	2
88	BPI	BIG PINEY	WY	NM	11 / 89	1
89	OGD	OGDEN	UT	NM	11 / 89	1
90	MTU	MYTON	UT	NM	11 / 89	1
91	HVE	HANKSVILLE	UT	NM	11 / 89	1
105	DTA	DELTA	UT	NM	12 / 89	1

SOUTHERN REGION (ASO)

136	LIB	LIBERTY	NC	SO	1 / 90	4
152	ISO	KINSTON	NC	SO	2 / 90	4
153	ELW	ELECTRIC CITY	SC	SO	2 / 90	4
154	VAN	VANCE	SC	SO	2 / 90	4
155	VNA	VIENNA	GA	SO	2 / 90	4
156	SAV	SAVANNAH	GA	SO	2 / 90	4
168	CNG	CUNNINGHAM	KY	SO	3 / 90	3
170	TAY	TAYLOR	FL	SO	3 / 90	4
171	ORL	ORLANDO	FL	SO	3 / 90	4
172	SRQ	SARASOTA	FL	SO	3 / 90	4
173	MIA	MIAMI	FL	SO	3 / 90	4
181	JAN	JACKSON	MS	SO	4 / 90	2
182	EWO	NEW HOPE	KY	SO	4 / 90	3
183	LOZ	LONDON	KY	SO	4 / 90	3
184	TYS	KNOXVILLE	TN	SO	4 / 90	3
185	SYI	SHELBYVILLE	TN	SO	4 / 90	3
186	RMG	ROME	GA	SO	4 / 90	3
192	HLI	HOLLY SPRINGS	MS	SO	5 / 90	2
196	VUZ	VULCAN	AL	SO	5 / 90	3
197	MVC	MONROEVILLE	AL	SO	5 / 90	3
198	MAI	MARIANNA	FL	SO	5 / 90	3

SOUTHWEST REGION (ASW)

12/12/88

6860.1
APPENDIX 1

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
6	BVO	BARTLESVILLE	OK	SW	5 / 89	ALL
7	MLC	MC ALESTER	OK	SW	5 / 89	ALL
8	ADM	ARDMORE	OK	SW	5 / 89	ALL
9	GAG	GAGE	OK	SW	5 / 89	ALL
10	HBR	HOBART	OK	SW	5 / 89	ALL
125	BGD	BORGER	TX	SW	1 / 90	2
126	TXO	TEXICO	TX	SW	1 / 90	2
127	GTH	GUTHRIE	TX	SW	1 / 90	2
128	BGS	BIG SPRING	TX	SW	1 / 90	2
129	SJT	SAN ANGELO	TX	SW	1 / 90	2
144	RSG	ROCKSPRINGS	TX	SW	2 / 90	2
145	THX	THREE RIVERS	TX	SW	2 / 90	2
146	LRD	LAREDO	TX	SW	2 / 90	2
147	BRO	BROWNSVILLE	TX	SW	2 / 90	2
161	IDU	INDUSTRY	TX	SW	3 / 90	2
162	ACT	WACO	TX	SW	3 / 90	2
163	LOA	LEONA	TX	SW	3 / 90	2
164	BUJ	BLUE RIDGE	TX	SW	3 / 90	2
165	TXK	TEXARKANA	AR	SW	3 / 90	2
178	MLU	MONROE	LA	SW	4 / 90	2
179	LCH	LAKE CHARLES	LA	SW	4 / 90	2
180	HRV	HARVEY	LA	SW	4 / 90	2
187	FMN	FARMINGTON	NM	SW	5 / 90	1
188	CIM	CIMARRON	NM	SW	5 / 90	1
189	ACH	ANTON CHICO	NM	SW	5 / 90	1
190	ONM	SOCORRO	NM	SW	5 / 90	1
191	ROW	ROSWELL	NM	SW	5 / 90	1
193	PBF	PINE BLUFF	AR	SW	5 / 90	2
194	ARG	WALNUT RIDGE	AR	SW	5 / 90	2
195	RZC	RAZORBACK	AR	SW	5 / 90	2
199	DMN	DEMING	NM	SW	6 / 90	1
200	SFL	SALT FLAT	TX	SW	6 / 90	1
201	FST	FORT STOCKTON	TX	SW	6 / 90	1

WESTERN PACIFIC REION (AWP)

106	ELY	ELY	NV	WP	12 / 89	1
107	BQU	BULLION	NV	WP	12 / 89	1
108	LOL	LOVELOCK	NV	WP	12 / 89	1
120	FJS	FORT JONES	CA	WP	1 / 90	1
121	RDD	REDDING	CA	WP	1 / 90	1
122	LTA	LAKE TAHOE	CA	WP	1 / 90	1
123	SGD	SCAGGS ISLAND	CA	WP	1 / 90	1
124	SNS	SALINAS	CA	WP	1 / 90	1
139	EJF	SHAFTER	CA	WP	2 / 90	1

12/12/88

SEQ NO.	ID	LOCATION BY REGION	STATE	REGION	MONTH/YEAR	TEAM
140	BIH	BISHOP	CA	WP	2 / 90	1
141	TPH	TONOPAH	NV	WP	2 / 90	1
142	BTY	BEATTY	NV	WP	2 / 90	1
143	LAS	LAS VEGAS	NV	WP	2 / 90	1
157	PSP	PALM SPRINGS	CA	WP	3 / 90	1
158	BZA	BARD	AZ	WP	3 / 90	1
159	BXK	BUCKEYE	AZ	WP	3 / 90	1
160	TUS	TUCSON	AZ	WP	3 / 90	1
174	SJN	ST JOHNS	AZ	WP	4 / 90	1
175	INW	WINSLOW	AZ	WP	4 / 90	1
176	PGS	PEACH SPRINGS	AZ	WP	4 / 90	1
177	PGA	PAGE	AZ	WP	4 / 90	1

12/12/88

6860.1
Appendix 2

APPENDIX 2. ACRONYMS

ADL	Development and Logistics
ALG	Acquisition and Materiel Service
ASA	Advanced System Acquisition Service
ASM	Systems Maintenance Service
AVLORMON	LORAN-C Aviation Monitor
CO	Contracting Officer
DOD	Department of Defense
ECD	Envelope to Cycle Difference
EIA	Electronics Institute of America
FSS	Flight Service Station
FAA	Federal Aviation Administration
F&E	Facilities and Equipment
GA	General Aviation
GDOP	Geometric Dilution of Precision
GPS	Global Positioning System
GRI	Group Repetition Interval
IFR	Instrument Flight Rules
IOT	Input Output Terminal
ISH	Installation Standards Handbook
JAI	Joint Acceptance Inspection
Loran	Long Range Navigation
LRU	Line Replaceable Unit
MTBF	Mean Time Between Failure
NAILS	National Airspace Integrated Logistics Support Plan
NFSG	National Field Support Group
QRO	Quality and Reliability Officer
RCO	Remote Communications Outlets
RMC-F	Remote Monitor and Control-Facility
RMS	Remote Monitoring Subsystem
RNAV	Area Navigation
SIAP	Standard Instrument Approach Procedure
SIP	System Implementation Plan
SNR	Signal To Noise Ratio
SPP	System Program Plan
TD	Time Difference
USCG	United States Coast Guard
VHF	Very High Frequency
VOR	VHF Omnidirectional Radio Range

12/12/88

6860.1
Appendix 3

APPENDIX 3

MEMORANDUM OF UNDERSTANDING
BETWEEN

GROUND TO AIR SYSTEMS DIVISIONS,
NATIONAL AIRWAY ENGINEERING FIELD SUPPORT SECTOR

AND

THE FAA DEPOT
MIKE MONRONEY AERONAUTICAL CENTER

AND

THE ENGINEERING DIVISION
FAA TECHNICAL CENTER

AND

ALL RECEIVING
REGIONS FOR THE
LORAN-C AVIATION
MONITOR
ANCILLARY SOFTWARE

AND

HARDWARE

PREPARED BY: ASE-220
June 8, 1988

INTRODUCTION

This document is a Memorandum of Understanding (MOU) between the Ground to Air Systems Division (ASA-100); The National Airway Engineering Field Support Sector (ASM-150); the FAA Depot (AAC-400); The Engineering Division, FAA Technical Center (ACT-140); and all affected regions.

1.1 PURPOSE

This MOU defines the Configuration Management (CM) related activities and responsibilities of ASA-100, AAC-400, ASM-150, ACT-140 and the regions for the Long Range Navigation System (LORAN-C) during the period of transition from the contractor to the Government at the Mike Monroney Aeronautical Center and thereafter at each site out to the last Operational Readiness Demonstration (ORD). In addressing these activities and responsibilities, this MOU focuses on baselining the LORAN-C, transferring CM responsibilities and specifying the process for ensuring LORAN-C configuration integrity during the period of transition.

1.2 OBJECTIVES

The specific objectives of this MOU are:

1. Ensure that the LORAN-C Signal Monitor (as accepted from Frontier Engineering, Inc.) is baselined and that all subsequent LORAN-C change activity is traceable to it.
2. Specify the Hand-Off process from ASA-100 to ASM-150/AAC-400 at the Aeronautical center, ACT-140 at the FAA Technical Center and to each of the field sites.
3. Specify the items comprising the LORAN-C Hand-Off package at the Aeronautical Center and at each of the field sites (ACT-140 will receive a temporary asset).
4. Define the roles of ASA-100, ASM-150, AAC-400, ACT-140 and the regions in support of Baseline Management. These roles include interfaces with each site.
5. Define shortcomings as they relate to Hardware/Software Documentation Maintenance and Control.

1.3 OVERVIEW

The Ground to Air Systems Division, ASA-100, is procuring the LORAN-C Signal Monitor and associated Software and Hardware for delivery to 196 sites and the Mike Monroney Aeronautical Center. Fifteen systems are being shipped to the Aeronautical Center and will be used for development and support activities, training and maintenance. One system will be shipped to the Technical Center for operational integration testing, as well as development and support activities. ASM-150 will develop and approve the Shakedown Test Procedures.

Conditional First Production System Acceptance occurs at completion of Design Qualification Testing and Inplant Reliability Demonstration which is tentatively scheduled to occur on March 25, 1988. Unconditional acceptance will be made upon completion of reliability testing of a fielded system. ASA-100 accepts the First Article from Frontier on behalf of the Government.

ASA-100 will then Hand-Off the system to the appropriate FAA Operational and Maintenance Organizations. This process in effect constitutes a dual transition. First Article Acceptance constitutes Hand-Off of initial product from Frontier to ASA-100. The second Hand-Off occurs when ASM-150/AAC-400. ACT-140 and the regions accept the system from ASA-100.

ACT-140 is the receipt organization and Custodian for the LORAN-C Software Documentation, tools and all the Software Magnetic Media during Operational Integration Testing. They will be responsible for identifying and notifying ASA-100 of all software anomalies discovered during Operational Integration Testing. Software supplied by the manufacturer will be reviewed for completeness and sufficient documentation to modify the software if needed. At the end of testing, all LORAN-C Software Documentation, Tools and all the Software Magnetic Media will be transferred to ASM-150.

ASM-150 is the recipient organization for the LORAN-C Technical Documentation for Hardware and Software. They are the custodians of the Instruction Books and Maintenance Handbooks. They are responsible for the planning and conduct of Shakedown Testing. They will be the recipients of the LORAN-C Software Documentation, Tools, and all Software Magnetic Tapes/Disks after Operational Integration Testing is completed. They are responsible for the CM of Hardware & Software Documentation and Firmware maintenance following the successful completion of shakedown testing.

AAC-400 is responsible for validation, verification and maintenance of all Provisioning Technical Documentation and the Baselined Engineering Drawing Package. The recipient regions will be responsible for site acceptance and site specific documentation.

To ensure that the LORAN-C is adequately baselined and its configuration controlled during the transitioning period, LORAN-C will be introduced into the NAS inventory and formally configuration managed following establishment of the product baseline.

1.4 APPLICABLE REFERENCES

The relevant documents referred to in this MOU are listed below:

1. FAA Contract DTFA01-87-C-00006, Acquisition Phase of the Long Range Navigation System (LORAN-C) Signal Monitor, dated October 16, 1986.
2. FAA Order 1800.8e, NAS Configuration Management, July 11, 1985.
3. Configuration Management Plan for the LORAN-C (CDRL Item).

2.0 DESCRIPTION OF LORAN-C CM TRANSITIONING ACTIVITIES

2.1 TRANSITIONING OF THE LORAN-C TO THE GOVERNMENT

ASA-100 will accept the First Article LORAN-C Hardware and Software at Frontier Engineering, taking interim custody/ownership on behalf of the Government. Installation at the first site is scheduled for May 1988.

As a prerequisite to accepting the LORAN-C First Article, the contractor is required to conduct Functional and Physical Configuration Audits (FCA/PCA) for ASA-100. The QRO at Frontier Engineering will then audit the contractor's efforts either by witnessing the contractor's actions or by examining the contractor's minutes and verifying the correctness of all actions taken.

Upon successful completion of the Configuration Audits and receipt of the audit report from the QRO, ASA-100 will initiate a casefile for the LORAN-C Product Baseline in accordance with FAA Order 1800.8e. A generic listing of the Product Baseline Constituents is shown at Figure 1 (Product Baseline specifies will be identified at the PCA). ASA-100 signature on the configuration control decision (CCD) for the product baseline NCP signals the requirement for government baseline management activity for the entire LORAN-C Product Structure. ASA-100 will Hand-Off this baseline and management responsibility thereof, to the appropriate FAA receiving organizations, namely, ASM-150, AAC-400, ACT-140 and the regions, in accordance with Figures 3 and 4.

Subsequent to ASA-100's acceptance of the LORAN-C First Article, ACT-140 will conduct Integration Testing to ascertain that the LORAN-C can be successfully integrated within the NAS and ensure functional equivalence to the LORAN-C specification FAA-E-2762. ASM-150 will then validate all Instruction Books and Maintenance Handbooks to verify supportability and maintainability of the system prior to implementation within the NAS.

Finally, the regions will witness installation of the LORAN-C Monitor at each of the sites and will validate installation procedures and materials prior to site acceptance.

This MOU will identify all CM requirements pertinent to each stage of this transition process to ensure that changes to the system are properly coordinated and are documented for traceability to ensure design integrity.

2.2 BASELINE MANAGEMENT

2.2.1 FOLLOWING FCA/PCA - PRIOR TO COMPLETION OF RELIABILITY TESTING

Prior to successful completion of reliability testing, Baseline Management responsibility resides solely with the Ground to Air System Division, ASA-100. The roles of all Hand-Off participants are depicted in the block diagram, figure 3.

2.2.1.1 GROUND TO AIR SYSTEMS DIVISIONS

ASA-100 will be responsible for chairing CCB's for all NCP's arising as a result of Hardware and Software Anomalies to bring system performance into agreement with LORAN-C specifications for problems discovered during Shakedown and Integration, and Reliability test. They will ensure that all fixes have been successfully implemented in the form of Hardware and Software Modifications and documentation changes and are responsible for distribution of all changes to the Aeronautical Center and all regions. For any changes identified as being needed during Integration Testing that are outside the scope of Contract DTFA01-87-C-00006, ASA-100 will have the option of modifying the contract or delegating the responsibility for making changes to the Engineering Division of the FAA Technical Center with ACT-100's concurrence.

2.2.1.2 ENGINEERING DIVISION, FAA TECHNICAL CENTER

ACT-140 will support ASA-100 by identifying hardware and software problems through Integration Testing of the aviation monitor and may be called on by ASA-100 to revise the software depending on the nature of the change (see para. 2.2.1.1). In this event, ACT-140 will submit a casefile to AES-410 for MUST evaluation. ACT-140 will take interim custody of CM tools, and will release the CM tools to ASM-150 upon completion of Integration Testing. Following Integration testing this task and the CM tools will become the responsibility of ASM-150.

2.2.1.3 NATIONAL AIRWAY ENGINEERING FIELD SUPPORT SECTOR

ASM-150 will be responsible for conducting Shakedown Testing. They will generate casefiles for both Hardware and Firmware discrepancies during the course of Shakedown Testing. They will submit these casefiles through AES-410 to ASA-100 for resolution. Once the fix is implemented, ASM-150 will retest the system at the point of departure to verify the adequacy of the fix.

2.2.1.4 THE FAA DEPOT

AAC-400 will be coordinated with during the course of casefile development as a result of problems encountered during Reliability, Maintainability, Shakedown and Integration Testing to ensure that all tooling, test equipment and provisioning technical documentation concerns are accounted for. All approved CCD's will be channeled to AAC-400 to allow them to accurately complete validation and verification of the Provisioning Technical Documentation and Level 3 Drawing Package.

2.2.1.5 REGIONS

All regional offices will be responsible for making existing site drawings available, for sites within their jurisdiction, to Frontier Engineering, Inc for revision purposes relative to site adaption.

2.2.2 FOLLOWING SUCCESSFUL COMPLETION OF RELIABILITY TESTING

Following successful completion of reliability testing, baseline management responsibility will fall under the jurisdiction of ASM-100 for all changes affecting the Instruction Books and Equipment Maintenance Handbooks. ASM-100 will subsequently inform AAC-400 of approved changes so that corresponding changes may be made to the Provisioning Technical Documentation and Level 3 Engineering Drawings. The roles of all hand-off participants are as depicted in the block diagram, figure 4.

2.2.2.1 GROUND TO AIR SYSTEMS DIVISION

The Ground to Air Systems Division will continue to be the focal point for all NCP's affecting LORAN-C subsystem specifications (National Change) and will act as the mediator for resolving disagreements between the CCB membership and ASM-150/Regions for decisions on Technical Instruction Book Changes/Waivers to Site Requirements.

2.2.2.2 MAINTENANCE ENGINEERING DIVISION, FAA HEADQUARTERS

ASM-100 will chair all Maintenance Engineering (ME) Configuration Control Boards (CCB's) for all changes that are peculiar to the sites and do not impact the generic hardware and software under the jurisdiction of the Ground to Air Systems Division consistent with 1800.8e policy. They will authorize all local Software and Hardware Modifications at this level in accordance with Order 1800.8e.

2.2.2.3 NATIONAL AIRWAY ENGINEERING FIELD SUPPORT SECTOR

ASM-150 is the recipient organization for the LORAN-C System Engineering Technical Documentation for all Hardware/Firmware/Software. They are the custodians of Hardware/Firmware and Software Documentation and are responsible for implementing changes to firmware as a result of any changes to the Programming Instructions following authorization from ASA-100 for all LORAN-C generic equipment. They will provide status accounting of system hardware/firmware configurations and provide repository services for the permanent storage of the Technical Instruction masters and firmware documentation. Finally, they will serve as system administrator to provide storage allocations, Operating System Security Constraints, Access priorities and communications requirements to the configuration Data Base. They will provide the Status Accounting Function of the System Software Configuration and provide library services for the permanent storage of programs and documentation.

2.2.2.4 THE FAA DEPOT

AAC-400 is the recipient organization for all provisioning technical documentation. They are responsible for validating, verifying and maintaining all logistics oriented documentation such as provisioning parts list, program parts selection list, Level III Engineering Drawings, etc., as assumed at the establishment of the Product Baseline and as

impacted by Reliability, Maintainability, Shakedown and Integration Testing. They will verify the maintainability aspects from the Depot standpoint of the LORAN-C by ensuring that the proper tooling, test equipment, etc., is available for system maintenance.

2.2.2.5 REGIONS

The recipient regions will be responsible for site acceptance and site specific documentation, generally installation/site adaption documentation for all sites within their jurisdiction. The regions will also be responsible for installation of the VOR FCPU Interface Card and for updating the FCPU firmware. They must generate casefiles for changes to site specific documents for site adaption purposes and have them processed in accordance with Order 1800.8e. Upon approval of the CCD, they must maintain records of the CCD's and revised documentation and verify the implementation of the change.

3.0 ANCILLARY HARDWARE/SOFTWARE AND DOCUMENTATION
FOR SOFTWARE/DOCUMENTATION MAINTENANCE

<u>ITEM</u>	<u>RECEIVING OFFICE</u>
MTOS	ACT-140/ASM-50
Microsoft C	ACT-140/ASM-150
Compiler and Linking Unit (Exact Type TBD)	ACT-140/ASM-150
FCPU Software Simulator	ACT-140/ASM-150
EPROM's (MIL-STD-Exact Number TBD)	ASM-150
Instruction Books and Maintenance Handooks	ASM-150/AAC-400
Provisioning Technical Documentation	AAC-400
Installation Procedures/Site Specific Documentation	All Regions

LORAN-C DELIVERABLE DATA CHECKLIST

SOFTWARE

1. Operations Manual
2. Program Maintenance Manual
3. Unassembled Highest Level Listing
4. Test Plans and Procedures and Data Forms-Factory Acceptance Test
5. Test Plans and Procedures and Data Forms-Site Acceptance Test

HARDWARE

1. Provisioning Parts List
2. Numerical Parts List
3. Long Lead-Time Items List
4. Item Identification/Item Logistics Data Records
5. Master Patterns and Plan Views of Parts Layouts
6. Drawings
7. Installation Material List
8. On Site Spares List
9. Spare Parts Peculiar List
10. Design Report
11. Test Plans and Procedures and Data Forms-Factory Acceptance Test
12. Test Plans and Procedures and Data Forms-Site Acceptance Test
13. Interface Control Drawings
14. Reliability Program Plans and Procedures
15. Reliability Demonstration Test Plans and Procedures
16. Maintainability Program Plans and Procedures
17. Maintainability Demonstration Test Plans and Procedures
18. Technical Instruction Book Manuscript

Questions regarding the content of this deliverable data or any specific questions regarding any element of this list should be referred to Mr. Robert Newman at (202) 646-5310.

Figure 1

4.0 CRITERIA FOR SUCCESSFUL FULFILLMENT OF HAND-OFF EVENTS

- First Article Acceptance Complete
- Successful Completion of the Functional/Physical Configuration Audits
- Delivery of Ancillary Hardware/Software and Documentation for Software/Documentation Maintenance (see Section 3.0)
- Completion of Shakedown, Integration, Reliability & Maintainability Testing and Resolution of all Discrepancies
- Preparation and Completion of the Hand-Off Package (see Figure 2)
- Memorandum of Agreement (MOA) signed by FAA Headquarters and All Parties Associated with System Hand-Off

HAND-OFF PACKAGE COMPOSITION

The Hand-Off Package will consist of:

- All Hardware Technical and Provisioning Documentation (see Figure 1)
- All Software Magnetic Tapes and Supporting Documentation (see Figure 1)
- CM Tools and Supporting Documentation (as identified in Section 3.0)
- A complete DF System and Ancillary Equipment
- Site Specific Installation Materials and Revised Site/Installation Documentation.

Figure 2

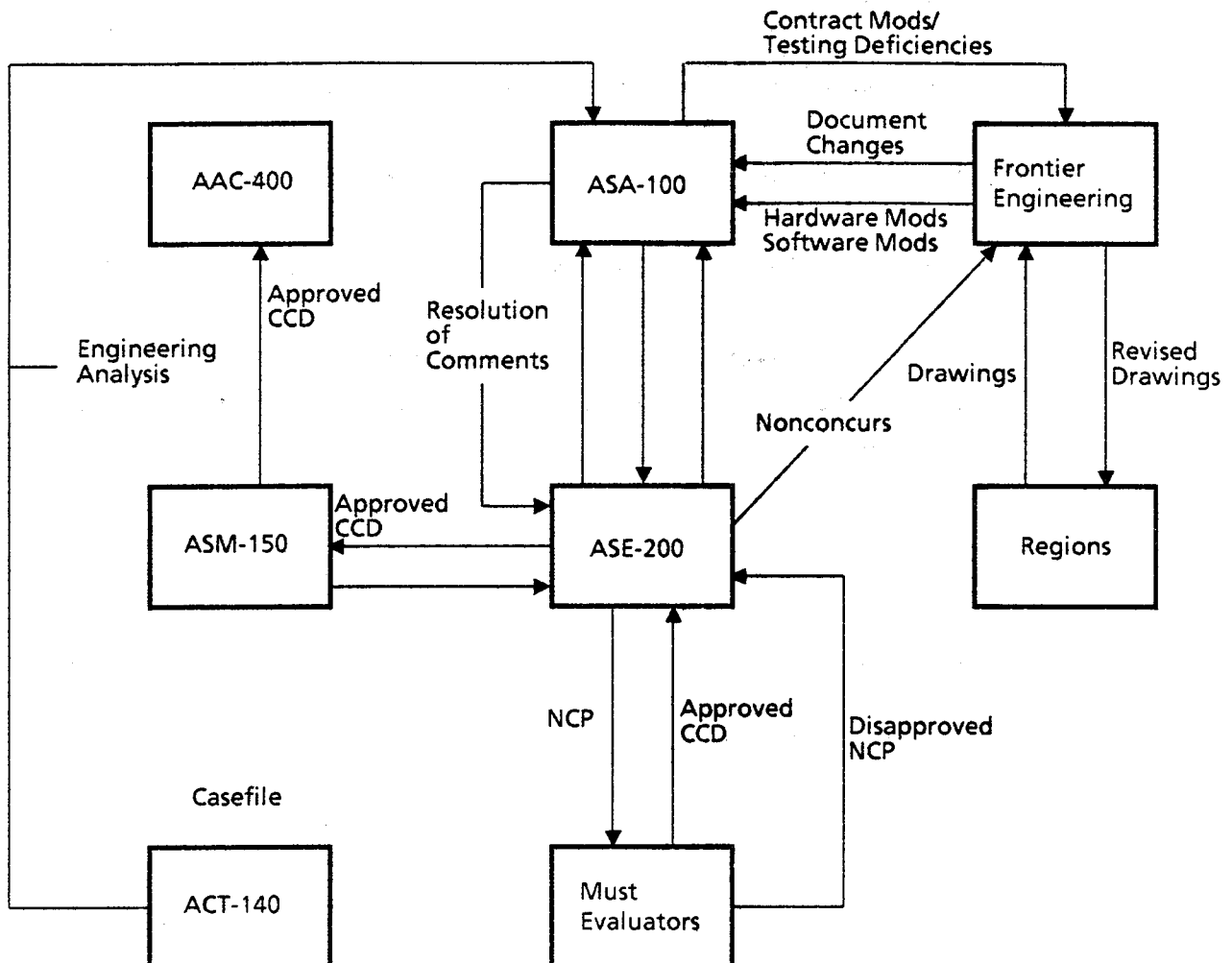


Figure 3 CM Responsibilities Prior to Reliability Testing

G8220-1

CM RESPONSIBILITIES
PRIOR TO RELIABILITY TESTING
FIGURE 3

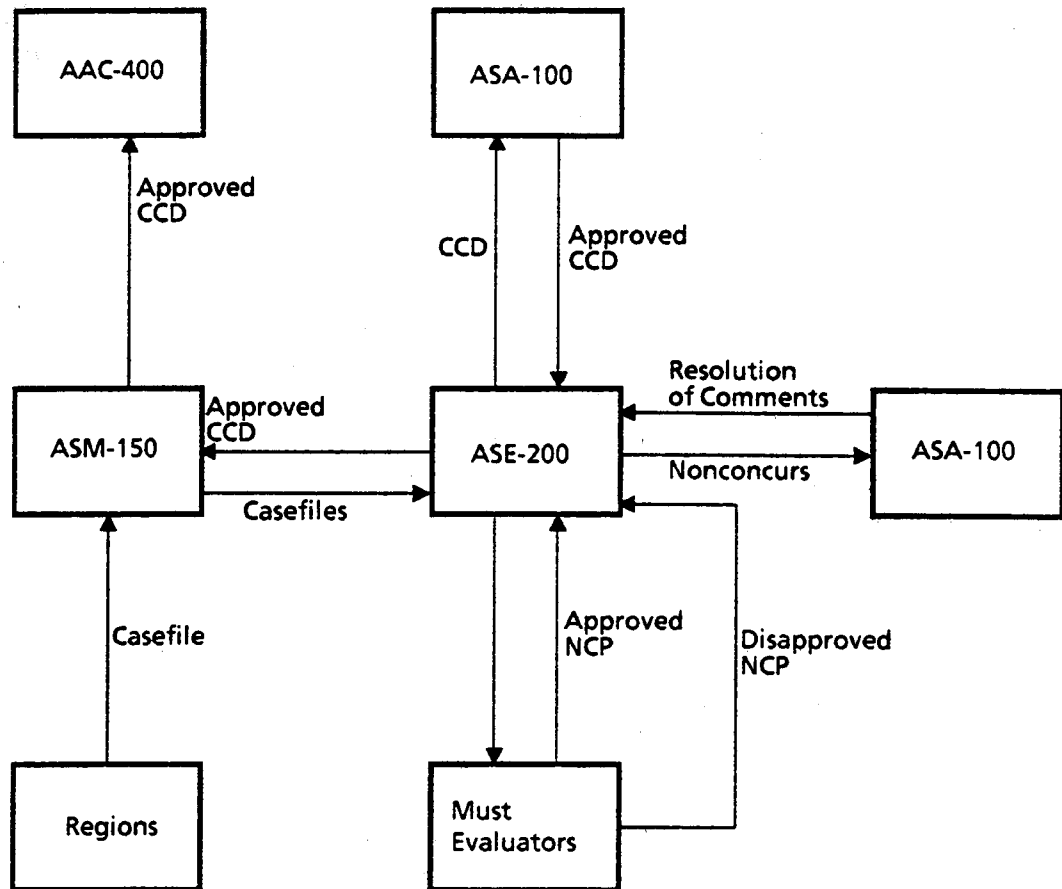


Figure 4 CM Responsibilities Following Reliability Testing

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CM RESPONSIBILITIES
FOLLOWING RELIABILITY TESTING
FIGURE 4

